SCIENCE, AERONAUTICS AND TECHNOLOGY

FISCAL YEAR 2000 ESTIMATES

BUDGET SUMMARY

OFFICE OF AERO-SPACE TECHNOLOGY **COMMERCIAL TECHNOLOGY/SBIR**

SUMMARY OF RESOURCES REQUIREMENTS

	FY 1998 OPLAN 9/29/98	FY 1999 OPLAN 12/22/98	FY 2000 PRES BUDGET	Page Number
		(Thousands of Dollars)		
Commercial Programs	25,200	33,700	29,200	SAT 4.3-2
Technology Transfer Agents	20,000	12,200	5,800	SAT 4.3-5
Small Business Innovation Research Programs	101,500	94,500	97,500	SAT 4.3-9
Total	146,700	140,400	132,500	
Johnson Space Center	13,325	16,452	16,800	
Kennedy Space Center	6,470	7,822	5,100	
Marshall Space Flight Center	30,620	21,398	21,800	
Stennis Space Center	4,107	4,306	4,000	
Ames Research Center	16,733	13,364	12,900	
Dryden Flight Research Center	2,916	3,312	3,400	
Langley Research Center	18,451	17,648	17,600	
Glenn Research Center	20,107	19,799	15,500	
Goddard Space Flight Center	27,425	26,391	24,100	
Jet Propulsion Laboratory	4,200	2,220	9,200	
Headquarters	2,346	7,688	2,100	
Total	146,700	140,400	132,500	

BASIS OF FY 2000 FUNDING REQUIREMENT

COMMERCIAL PROGRAMS

	FY 1998	FY 1999	FY 2000
		(Thousands of Dollars)	
Commercial Programs, subtotal	19,400	28,700	29,200
Special Interest Projects	5,800	5,000	--
Total Commercial Programs	25,200	33,700	29,200

PROGRAM GOALS

Commercial Programs facilitates the transfer of NASA inventions, innovations, discoveries or improvements developed by NASA personnel or in partnership with industry/universities to the private sector for commercial application leading to greater U.S. economic competitiveness. Accordingly, the goal of Commercial Programs is to share the harvest of NASA's technology programs with the U. S. industrial/scientific community. The goal encompasses the commercialization of technology developed in all the Agency's Enterprises, in past as well as current programs. The NASA Commercial Program mission includes a variety of mechanisms for achieving its goals: partnerships with industry/academia; federal/state/local alliances; emphasis on commercialization in new R&D procurements; electronic commerce; training and education of NASA employees/contractors; employee accountability; and application of performance goals/metrics.

STRATEGY FOR ACHIEVING GOALS

Changes in national R&D investment guidelines have elevated commercial technology transfer to a primary NASA mission. NASA's Agenda for Change, approved by Administrator Goldin in July 1994, is the Agency's blueprint for achieving this mission. Commercial Programs introduces a new way of doing business that involves a mix of practices/mechanisms which enable the Agency to more closely align its way of doing business with that of the private sector. The common denominator in these practices is technology partnerships. Technology partnerships are business arrangements among the government, industry, and/or academia wherein each party commits resources to the accomplishment of mutually agreed upon objectives and shares the risks and rewards of the endeavor. At the end of FY 1998, NASA has succeeded in accomplishing the National Performance Review goal of 10 to 20 percent of the NASA R&D budget in commercial technology partnerships with industry by achieving almost 16%.

The success of Commercial Programs is accomplished through:

- An extensive outreach program (technology dissemination and marketing);
- An electronic commerce/information network (via the Internet) that greatly facilitates the transfer of technology and allows very efficient implementation of our technology business contacts and services;
- Training and education of NASA employees to emphasize program relevance to national needs and to facilitate program implementation; and
- the establishment of metrics that address the day-to-day management processes as well as bottom-line results.

The Agenda for Change marked the beginning of NASA's new focus, management commitment, and employee empowerment to improve NASA's contributions to America's economic security as a vital by-product of NASA's aeronautics and space missions.

SCHEDULES & OUTPUTS

Expand training program for NASA R&D program managers. Plan: April 1998 Actual: September 1998	Expanded training to help foster the Agency's internal culture change necessary to increase technology transfer and partnerships with private industry. Initiated, via the Internet, distance learning pilot program to enhance cost-effective training opportunities. Internet image stream took longer to set up than expected.
Assess approximately 100% of NASA technology for commercial application. FY 1999 Plan: December 1998 Actual: December 1998 FY 2000 Plan: December 1999	In FY98 we assessed over 8,800 activities to which NASA obligated over $10 billion. This represented approximately 85% of NASA's programs and activities. 1,169 new technologies and innovations were identified and evaluated for commercial application. Current inventory of technology will be reviewed, assessed and rated for commercial potential. Current inventory of technology will be reviewed, assessed and rated for commercial potential.
Increase percentage of NASA R&D Invested in Commercial Partnerships with a goal of achieving 15-20% Plan: December 1999	Show steady improvement toward reaching 20%, providing assurance that we can meet the upper range of the National Performance Review goal for the Agency. Current performance level is 16 percent.
Expand training program for NASA R&D program managers. Plan: September 1999	Expand the distance learning and classroom training program to several training sessions with increased participation to help foster the Agency's internal culture change and further improve technology transfer performance.

ACCOMPLISHMENTS AND PLANS

In FY 1998, the emphasis was on increasing commercial partnerships with industry and continuing refinement of the technology and partnership database, updating it to include new Agency contracting efforts and to describe new technologies that are to be made public on the electronic network. The Agency also improved a new information network for commercial technology transfer. The partnership goal was achieved, and there was an increase in R&D partnerships from 10 to approximately 16 percent of the relevant NASA R&D program. In addition, the commercial technology program significantly improved the technology information available to the public and the efficient management of the technology database. The number of technologies made available to the business community and offered for partnership via the TechTracS electronic commerce system has increased over 30% -- from 15,000 in January 1996 to about 20,000 in September 1998.

In FY 1999 and FY 2000, the emphasis will be on increasing commercial partnerships with industry and continuing refinement of the technology and partnership database, updating it to include new Agency contracting efforts and to describe new technologies that are to be made public via the electronic network. The Agency's goal for these years will be to increase the percentage of the NASA R&D budget in commercial partnerships with industry to 16-18 percent in FY 1999 and approach 20 percent in FY 2000. The FY 1999 funding level for Commercial Programs also includes funds to administer the SBIR program, with emphasis placed on improving services to small businesses. In FY 1999 and FY 2000, NASA will continue to utilize and improve the Internet as an electronic marketplace for NASA technology assets, facilitating technology transfer and commercialization opportunities between U. S. industry and NASA. In addition, a series of training opportunities focused on the commercial technology strategy and its implementation actions will be expanded within NASA's management training program.

BASIS OF FY 2000 FUNDING REQUIREMENT

TECHNOLOGY TRANSFER AGENTS

	FY 1998	FY 1999	FY 2000
		(Thousands of Dollars)	
Technology Transfer Agents, subtotal	7,800	7,200	5,800
Special Interest Projects	12,200	5,000	--
Total Technology Transfer Agents	20,000	12,200	5,800

PROGRAM GOALS

The goal of Technology Transfer Agents is to facilitate the transfer of NASA and other federally sponsored research and technology (and associated capabilities), to the U. S. private sector for commercial application. The purpose of this program goal is to enhance U. S. industrial growth and economic competitiveness.

STRATEGY FOR ACHIEVING GOALS

In conformance with Congressional direction, NASA has funded the NTTC at Wheeling Jesuit College in West Virginia since 1990 to serve as a national resource for the transfer and commercialization of federal research and technology. A key, on-going strategy is to align and integrate NTTC operations with the NASA Commercial Technology Programs in support of the NASA Commercial Technology Mission/Agenda for Change. This strategy provides a foundation upon which the NTTC may fulfill its national role through technology transfer programs funded by other federal agencies and the provision of cost-recovery products and services. Accordingly, NASA has facilitated the involvement of other federal agencies to leverage and extend NTTC capabilities funded by NASA and has enabled the NTTC to implement cost-recovery activities in support of the overall federal technology transfer mission.

In accordance with the NTTC's national role and the NASA Commercial Technology Mission/ Agenda for Change, the NTTC performs four core roles: (1) Serve as a national gateway for federal technology transfer and commercialization, assisting U. S. industry to locate and access NASA and other federally-sponsored technology resources and sources of technical/business assistance; (2) Assess NASA and other federal technologies for commercial potential, and facilitate partnerships for technology commercialization; (3) Develop and deliver professional-level training in technology transfer and commercialization for NASA, federal agencies and other public and private sector audiences; and (4) Promote U. S. industry awareness and utilization of NASA and other federally sponsored research and technology resources available for commercial purpose.

In FY 2000, in recognition of the NTTC's maturing operations and services, the implementation of the NTTC program will transition from a cooperative agreement into a contractual funding instrument. A contract is an appropriate vehicle for the performance and delivery of high-quality technology transfer and commercialization services that directly support the NASA Commercial Technology Mission. This will further improve the effectiveness of the NTTC program and foster the privatization of the NTTC.

SCHEDULES & OUTPUTS

In partnership with NASA, implement six national conferences, including Tech 2008 Plan: September 1998 Actual: September 1998	Further the Agenda for Change goal of marketing NASA's capabilities. Tech 2008 was completed during the first quarter FY 1999; six additional national technology conferences were conducted in FY 1998: Medical Design and Manufacturing, Society of Automotive Engineers, National Design and Engineering Show, SAMPE, ISA and Tech 2007.
In partnership with NASA, target specific industries and companies who may benefit from NASA technology and develop marketing strategies to those industries and firms. Plan: September 1998 Actual: September 1998	Supports the Agenda for Change goal of marketing NASA's capabilities. The results will be establishing R&D partnerships with industry leading to new products and services based on NASA technology. In conjunction with the NTTC, NASA's marketing plan is comprised of targeting a series of four national industry sectors: manufacturing, materials, medical devices, and sensors /instrumentation. During FY 98, NASA/NTTC implemented its first public service message campaign targeting each of these sectors. This effort has produced valuable business leads for the NASA Centers. Since NASA started this effort, the number of technology inquiries has grown from 1,248 in FY 96 to over 8,200 in FY 98. In addition, U.S. Ad Review, a nationally recognized advertising review board, recognized NASA as having one of the best marketing campaigns in the country. NASA also launched a new strategy for turning trade shows in which NASA was an exhibitor into deal- making events. NASA now pre-qualifies companies prior to the show and sets up business meetings between the inventor and the interested company. At the three trade shows where this strategy was conducted, at least 50% of the technologies showcased received excellent leads. These leads are currently being followed up by NASA Centers with the goal of an R&D partnership or a license. Modeled along efforts pursued by the private sector, NASA's strategy is focused on integrating public relations, public service messages, direct mail, and trade shows to convey the message that NASA is a technology resource that companies can fully utilize to their advantage.
In partnership with NASA, develop and deliver a professional training program for US industry. Plan: September 1998 Actual: September 1998	Developed three courses for a professional training program for US industry. The goal is to enable companies to successfully commercialize NASA technology.
In partnership with NASA, deliver Commercial Technology training courses. Plan: September 1999	Supports the Agenda for Change goal of fostering an internal Agency culture change and implementation of required skills and best practices through training and education. Ten courses will be delivered in FY 1999.

In partnership with NASA, generate and maintain broad industry interest in NASA technologies and increase the number of qualified referrals for NASA technology Plan: September 1999	Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies in FY 1999.
Increase the Assessment/ Partnering between NASA and Industry Plan: September 1999	Complete 25 in-depth commercialization potential assessments of NASA technologies, facilitate venture financing for 10 NASA SBIR firms, and qualify and assist licensing/partnering agreements for 10 NASA technologies in FY 1999.
In partnership with NASA, deliver Commercial Technology training courses. Plan: September 2000	Supports the Agenda for Change goal of fostering an internal Agency culture change and implementation of required skills and best practices through training and education. Ten courses will be delivered in FY 2000.
In partnership with NASA, maintain broad industry interest in NASA technologies and maintain the number of qualified referrals for NASA technology. Plan: September 2000	Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies per year in FY 2000.
Maintain the Assessment/ Partnering between NASA and Industry Plan: September 2000	Complete 25 in-depth commercialization potential assessments of NASA technologies, facilitate venture financing for 10 NASA SBIR firms, and qualify and assist licensing/partnering agreements for 10 NASA technologies in FY 2000.

ACCOMPLISHMENTS AND PLANS

In cooperation with NASA, the NTTC has implemented marketing and outreach activities (e.g. public service announcements, trade shows, direct mail, publications and Internet/Web-sites) with NASA to generate U. S. industry awareness of, and interest in, utilizing and commercializing NASA technologies. NTTC marketing and outreach activities, in FY 1998, resulted in over 16,000 inquiries for NASA technology, which the NTTC serviced and screened; resulting in over 600 qualified referrals for NASA technologies. The NTTC has also teamed with NASA to deliver 18 training events designed to improve the knowledge and application of skills and methods for technology transfer and commercialization across NASA. The NTTC continued, in FY 1998, to develop, test, and implement distance learning and Internet-based training activities, further establishing its role within the NASA

community as a leading resource for technology transfer/commercialization training. In addition, the NTTC implemented new capabilities and activities, including the piloting of technology commercialization reviews in FY 1998, to perform market and technology assessments of NASA-sponsored technologies, and to facilitate the technology commercialization process. The NTTC will build upon these activities and capabilities in FY 1999 and FY 2000 to perform its four key roles for NASA as well as leveraging and extending NASA-funded capabilities to implement cost-recovery products/services and to conduct activities funded by other federal agencies.

The NTTC is currently in its final year under a five-year cooperative agreement with NASA. NASA will be assessing the NTTC's performance and capabilities relative to the NASA Commercial Technology Mission during the remainder of the agreement to determine the requirements and appropriate contractual funding instrument for the planned continuation of the program in FY 2000 and beyond.

In conformance with FY 1996 Congressional direction, NASA awarded and fully-funded in FY 1996 a four-year Cooperative Agreement to Montana State University (MSU) to establish and operate a rural technology transfer and commercialization center (known as the NASA/MSU TechLink Center) to assist companies and targeted industries in Montana, Idaho, N. Dakota, S. Dakota and Wyoming to utilize and commercialize technologies from NASA, federal laboratories, and universities. The Center provides services to targeted industries (natural resource-based industries, specifically agriculture, mining; forest/wood products, technology-based industries, including environmental services, photonics, and electronics/communications) directed towards creating technology partnerships with NASA and other federal/university technology sources and fostering successful technology commercialization and business development within the upper plains region. In FY 1998, the Center facilitated eight technology partnerships between and NASA and U.S. firms, and is currently working to assist the formation of 15 technology partnerships in FY 1999. During FY 2000, the terms of the cooperative agreement fulfilled and the agreement will be completed. The TeckLink is currently seeking to diversify funding with support from other federal agencies and industry.

BASIS OF FY 2000 FUNDING REQUIREMENT

SMALL BUSINESS INNOVATION RESEARCH PROGRAMS

	FY 1998	FY 1999	FY 2000
		(Thousands of Dollars)	
Small Business Innovation Research.....	101,500	94,500	97,500

PROGRAM GOALS

The goals of NASA's Small Business programs are to promote the widest possible award of NASA research contracts to the small business community as well as to promote commercialization of the results of this research by the small business community.

STRATEGY FOR ACHIEVING GOALS

Established by Congress, the Small Business Innovation Research (SBIR) program and the Small Business Technology Transfer (STTR) programs help NASA develop innovative technologies by providing competitive research contracts to U. S. owned small businesses. The program is structured in three phases:

Phase I is the opportunity to establish the feasibility, technical merit, and NASA mission need of a proposed innovation. Selected competitively, Phase I contracts have a term of six months and currently do not exceed $70,000.

Phase II is the major R&D effort in SBIR. The most promising Phase I projects are selected to receive contracts worth up to $600,000 and having a term of up to two years. Approximately 50 percent of Phase I projects are approved for Phase II.

Phase III is the completion of the development of a product or process to make it marketable. SBIR program funding cannot used to support the Phase III program. Private sector investment and sales of products and services based on the SBIR technology is the usual source of Phase III funding**.**

The FY 1998 NASA SBIR solicitation included 28 major topic areas divided into 118 sub-topics. The description of each of these sub-topics is developed by various NASA installations to include current and foreseen Agency program needs and priorities. NASA typically receives over 2,000 proposals. For each solicitation, proposals are evaluated by the NASA field centers for scientific and technical merit, key staff qualifications, soundness of the work plan, and likelihood of commercial application. NASA Headquarters (HQ) program offices provide additional insight regarding commercial feasibility, program balance, and critical Agency requirements. Selections are made by NASA HQ, based upon these recommendations, and other considerations. During FY 1998, there were 340 Phase I awards.

NASA continues to utilize the Internet extensively to administer the program. NASA also provides information for public access via a bulletin board service and other Internet information servers. Moreover, NASA continues to increase it's use of the Internet and information technology in it's operational processes including the development of the technical solicitation sub-topics; for public release of the solicitation in a variety of electronic formats; and for proposal evaluation. The end-to-end electronic solicitation process is serving as a resource not only within NASA, but is being viewed as a prototype for other government agencies.

Several other innovations continued to strengthen small business programs. External evaluation of each proposal's ultimate commercial potential is now a foundational part of the selection process. In addition, a comprehensive survey of past SBIR projects' Phase III commercialization and/or mission application continues to be conducted. The information from the review/survey will be used to identify critical predictors of commercial viability and, therefore, be used to increase the commercialization effectiveness of the program. Finally, the process of mapping several sub-topics into specific NASA mission applications continues to be a focus for strategic planning activities. The intent is to more closely tie the SBIR program with the primary mission needs of each NASA Enterprise.

The NASA SBIR program has contributed to the U. S. economy by fostering the establishment and growth of over 1,100 small, high technology businesses. More than 430 private ventures have been initiated based on NASA SBIR programs. Over one hundred of the SBIR Phase II firms have produced Phase III agreements generating at least $1 million per firm in new revenues.

SCHEDULES & OUTPUTS

The program supports schedules and outputs in multiple areas. The program must be implemented in a manner that maximizes the potential for success. Therefore, a set of metrics for successful completion of each solicitation (Pre-solicitation, Solicitation, Selection/Award, and Post-Award) activity continues to be refined and used to assess the operational and management performance of the program. In addition, NASA is in the process of obtaining commercialization metrics (revenue; jobs creation) from previous SBIR awardees in order to better measure the contribution of the SBIR Program to the overall success in meeting the Agency's commercialization goals.

Select and announce new SBIR Phase I awards resulting from the FY 1997 solicitation	Initiates awards for new solicitation.
Plan: February 1998	All supporting activities completed successfully and as planned.
Actual: February 1998	
Complete development and issue the FY 1998 SBIR solicitation.	Necessary to ensure the success of the FY 1998 research program.
Plan: April 1998	All supporting activities completed successfully.
Actual: April 1998	

Select and announce new SBIR Phase I awards resulting from the FY 1998 solicitation. Plan: November 1998 Actual: October 1998	Initiates awards for new solicitations. All supporting activities completed successfully; all Program planned activities successfully scheduled.
Select and announce new SBIR Phase II awards resulting from the FY 1997 solicitation. Plan: October 1998 Actual: December 1998	Initiates follow-on awards resulting from prior Phase I results. All supporting activities completed successfully and as planned.
Complete development and issue the FY 1999 SBIR Phase I solicitation. Plan: April 1999	Necessary to ensure the success of the FY 1998 research program. Provide initial assessment of commercial success of FY 1983 - 1994 awardees and overall program performance.
Select and announce new SBIR Phase II awards resulting from the FY 1998 solicitation. Plan: November 1999 Revised: September 1999	Initiates follow-on awards resulting from prior Phase I results.
Select and announce new SBIR Phase I awards resulting from the FY 1999 solicitation. Plan: December 1999 Revised: October 1999	Initiates awards for new solicitation.
Perform commercial assessment FY 1998 outcome success and complete development the FY2000 SBIR solicitation Plan: April 2000	Ensure the success of the FY 1998 research program. Perform initial assessment of commercial success and overall performance of program
Select and announce SBIR Phase II awards resulting from the FY 1999 solicitation. Plan: August 2000	Initiates follow-on awards resulting from prior Phase I results;

ACCOMPLISHMENTS AND PLANS

In accordance with the Small Business Innovation Development Act of 1982, the actual SBIR funding level for the Agency is determined based on the results of a detailed analysis of the actual obligations for the most recent fiscal year that data is available.

For FY 1998 and FY 1999, the funding levels are based on actual data. For FY 2000, the funding level shown for SBIR is a placeholder that is used for planning purposes only. In early FY 2000, the Office of the Comptroller will perform a detailed assessment on the Agency's most recent actual data. If the results of the assessment conclude that the actual SBIR funding level varies from the budgeted amount, that change will be reflected in the Agency's initial operating plan to Congress.

In FY 1998, activities have been completed to secure alignment of the topic and subtopics in the SBIR programs with Enterprise needs, increase commercialization metrics collection and more adequately measure progress in commercializing technology.

The performance metrics are based on initial results of a survey being conducted utilizing an OMB approved data collection instrument and methodology. The survey continually captures various measures of commercial activity associated with NASA funded SBIR technology. An initial program performance assessment is expected to be available in March 1999.

FY 1999 and FY 2000 solicitations will include new SBIR Phase I and Phase II awards, and continued emphasis on and evaluation of commercial successes and successful applications to NASA programs. By December 1998, the 1997 Solicitation Phase II awards and 1998 Solicitation Phase I awards will be announced and under contract or in contract negotiation. In FY 1999, announcements will be made for the 1998 Solicitation Phase II awards and FY 1999 Phase I awards.